EXCALIBUR
by General International
21” TILTING HEAD SCROLL SAW
MODEL: CTEX-21CE

GENERAL INTERNATIONAL

ASSEMBLY AND INSTRUCTION MANUAL

CARBA-TEC®
TOOLS FOR WOOD

SETUP & OPERATION MANUAL

FEATURES & SPECIFICATIONS

- Head tilts 45° left and right.
- 21" Throat capacity.
- 2" Cutting thickness capacity.
- Large 13 1/2" x 23 1/2" (345mm x 597 mm) table surface.
- Finger operated blade clamps, no tools required.
- Easy access speed and tension controls.
- Organized blade storage on base.
- Unique tilting head design tilts the blade, not the table keeping the workpiece level for better control & more accurate cuts.

LENGTH
32" (812 mm)

WIDTH
15" (380 mm)

HEIGHT
15" (380 mm)

THROAT
21"(535 mm)

MAXIMUM CUTTING DEPTH
2" (53 mm)

SPEED (VARIABLE)
400 TO 1550 STROKES/MIN

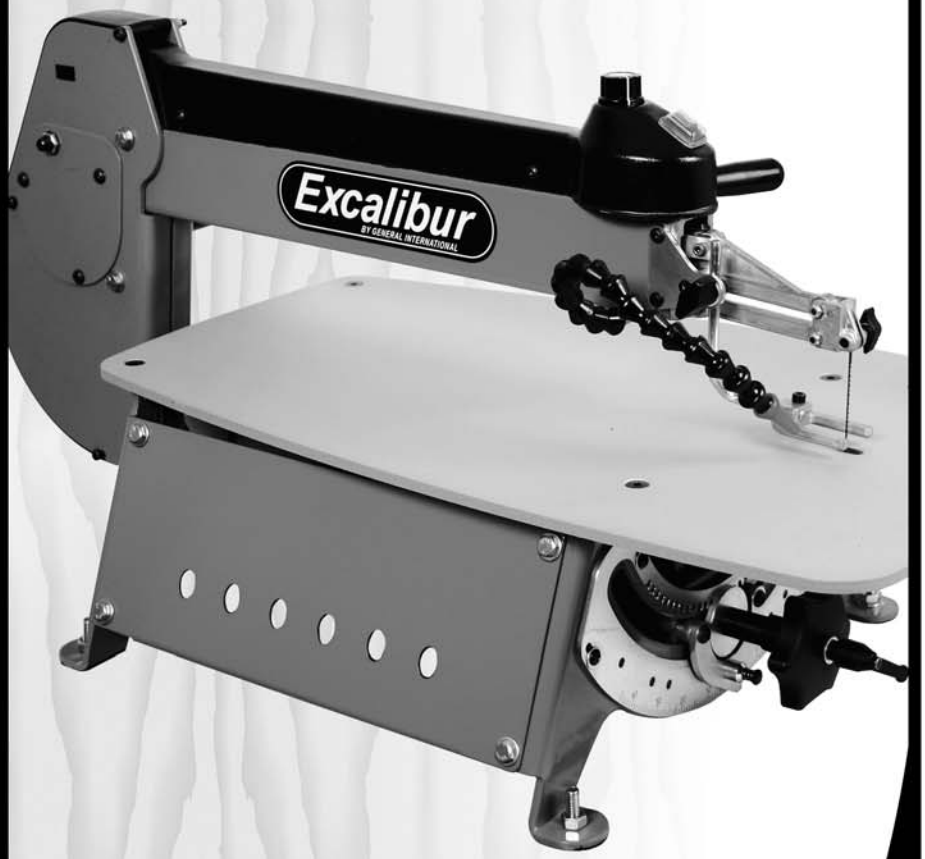
TABLE SURFACE
13 1/2" x 23 1/2" (345 x 597 mm)

MOTOR
110 V, 1.3 A

WEIGHT
65 LBS (29.5 kg)

Excalibur
BY GENERAL INTERNATIONAL

21" TILTING BLADE SCROLL SAW



MODEL #EX-21

GENERAL INTERNATIONAL

REVISION 1 - February 23/07

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THANK YOU for purchasing the Excalibur by General® International model EX-21 scroll saw. This scroll saw has been carefully tested and inspected before shipment and if properly used and maintained, will provide you with years of reliable service. To ensure optimum performance and trouble-free operation, and to get the most from your investment, please take the time to read this manual before assembling, installing and operating the unit.

The manual's purpose is to familiarize you with the safe operation, basic function, and features of this scroll saw as well as the set-up, maintenance and identification of its parts and components. This manual is not intended as a substitute for formal woodworking instruction, nor to offer the user instruction in the craft of woodworking. If you are not sure about the safety of performing a certain operation or procedure, do not proceed until you can confirm, from knowledgeable and qualified sources, that it is safe to do so.

Once you've read through these instructions, keep this manual handy for future reference.

GENERAL® INTERNATIONAL WARRANTY

All component parts of Excalibur by General® International products are carefully tested and inspected during all stages of production, and each unit is thoroughly inspected upon completion of assembly. Because of our commitment to quality and customer satisfaction, General® International agrees to repair or replace, within a period of 24 months from date of purchase, any genuine part or parts which, upon examination, prove to be defective in workmanship or material. In order to obtain this warranty, all defective parts must be returned freight pre-paid to General® International Mfg. Co., Ltd. Repairs attempted without our written authorization will void this warranty.

Disclaimer: The information and specifications in this manual pertain to the unit as it was supplied from the factory at the time of printing. Because we are committed to making constant improvements, General® International reserves the right to make changes to components, parts or features of this unit as deemed necessary, without prior notice and without obligation to install any such changes on previously delivered units. Reasonable care is taken at the factory to ensure that the specifications and information in this manual corresponds with that of the unit with which it was supplied. However, special orders and "after factory" modifications may render some or all information in this manual inapplicable to your unit. Further, as several generations of this scroll saw and several versions of this manual may be in circulation, if you own an earlier or later version of this unit, this manual may not depict your unit exactly. If you have any doubts or questions contact your retailer or our support line with the model and serial number of your unit for clarification.

Rules for Safe Operation

To help ensure safe operation, please take a moment to learn the machine's applications and limitations, as well as potential hazards. General® International disclaims any real or implied warranty and hold itself harmless for any injury that may result from the improper use of its equipment.

1. Read, understand and follow all safety warnings and instructions in the supplied Operator's Manual.
2. Do not operate the saw when tired, distracted, or under the effects of drugs, alcohol or any medication that impairs reflexes or alertness.
3. Keep the work area well lit, clean and free of debris.
4. Keep children and shop visitors at a safe distance while operating the saw; do not permit them to operate the scroll saw.
5. Childproof and tamper proof your shop and all machinery with locks, master electrical switches and switch keys, to prevent unauthorized or unsupervised use.
6. Stay alert! Give your work undivided attention. Even a momentary distraction can lead to serious injury.
7. Fine particulate dust is a carcinogen that can be hazardous to health. Work in well ventilated area and use a dust collector whenever possible.
8. Wear approved safety glasses and dust mask. Do not wear loose clothing, gloves, bracelets, necklaces or jewellery while operating the saw.
9. Be sure all adjustment tools, wrenches or other clutter are removed from the machine and/or the table surface before operation.
10. Keep hands well away from saw blade and all moving parts. Use a brush, not hands, to clear away chips and sawdust.
11. Be sure that saw blade is properly installed, and in proper cutting direction, before operation.
12. Be sure the blade has gained full operating speed before beginning to cut.
13. Always use a clean, properly sharpened blade. Dirty or dull blades are unsafe and can lead to accidents.
14. Do not push or force stock into the blade. The saw will perform better and more safely when working at the rate for which it was designed.
15. Use suitable support when cutting stock that does not have a flat surface.
16. Avoid working from awkward or off balance positions. Do not overreach during cutting operation; keep both feet on floor. Never lean over or reach behind the blade and never pull the work piece through the cut from behind.
17. Never leave the machine unattended while running or with the power "ON".
18. Use of parts and accessories NOT recommended by General® International may result in equipment malfunction or risk of injury.
19. Never stand or lean on the saw. Serious injury could occur if the unit is tipped over or if the blade is unintentionally contacted.
20. Always turn off and disconnect from power source before servicing or changing accessories, blades, or before performing any maintenance or adjustments.
21. Make sure that switch is in the "OFF" position before plugging in the power cord.
22. Make sure saw is properly grounded. If equipped with a 3-prong plug it should be used with a three-pole receptacle. Never remove the third prong.

Additional Safety Instructions Specific to this Scroll Saw

Because each shop situation is unique, no list of safety guidelines can ever be complete. The most important safety feature in any shop is the knowledge and good judgement of the user. Use common sense and always keep safety considerations, as they apply to your individual shop situation first and foremost in mind. If you have any doubts about the safety of an operation you are about to perform: STOP! Do not perform the operation until you have validated from qualified individuals if the operation is safe to perform and what is the safest method to perform it.

1. Material hold-down must be properly set and remain in position during use.
2. Never reach under the table when operating or make any adjustments while the scroll saw is running.
3. Secure the saw to the work bench with clamps or mounting hardware.
4. Do not lift or carry the saw by the upper arm.
5. Make sure blade tension is properly adjusted.
6. Avoid awkward hand positions where a sudden slip could cause a hand to move into the saw blade. Do not place fingers or hands in the path of the saw blade.
7. When removing short workpieces, or cleaning up around the table, be sure that the saw is in the OFF position and that the blade has come to a complete stop.
8. Never turn the saw ON before making sure that the table is clear except for the workpiece and related feed or support devices for the operation planned.
9. Check for proper blade size and type.
10. Do not attempt to saw stock that does not have a flat surface unless a suitable support is used.
11. Turn off motor if the material resists being backed out of an incomplete cut. Use appropriate speed for applications.
12. CAUTION: Some wood contains preservatives such as copper chromium arsenate (CCA) which can be toxic. When cutting these materials, extra care should be taken to avoid inhalation and to minimize skin contact.
13. Always use a dust mask and safety glasses when sawing.
14. Keep guards in place and in working order.
15. Make sure your fingers do not contact the terminals of the power cord when plugging in or unplugging the saw.
16. Never overfeed or force work into the blade.

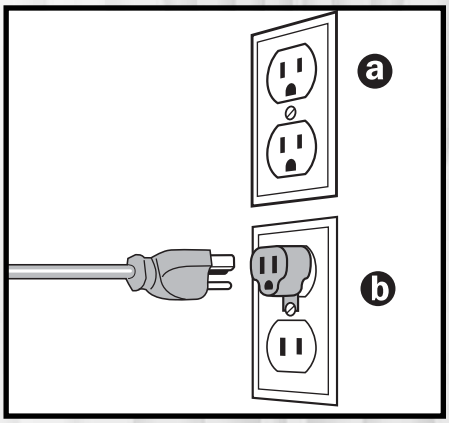
ELECTRICAL REQUIREMENTS

Before connecting the machine to the power source, verify that the voltage of your power supply corresponds with the voltage specified on the motor I.D. nameplate. A power source with greater voltage than needed can result in serious injury to the user as well as damage to the machine. If in doubt, contact a qualified electrician before connecting to the power source.

This tool is for indoor use only. Do not expose to rain or use in wet or damp locations.

GROUNDING INSTRUCTIONS

In the event of an electrical malfunction or short circuit, grounding reduces the risk of electric shock. The motor of this machine is wired for 110V single phase operation and is equipped with a 3-conductor cord and a 3-prong grounded plug to fit a grounded type receptacle, ⓐ . Do not remove the 3rd prong (grounding pin) to make it fit into an old 2-hole wall socket. If an adaptor plug is used, ⓑ , it must be attached to the metal screw of the receptacle.



Note: The use of an adaptor plug is illegal in some areas. Check your local codes.

DO NOT MODIFY THE PLUG PROVIDED.
If it will not fit your receptacle, have the proper receptacle installed by a qualified electrician.

CHECK with a qualified electrician or service person if you do not completely understand these grounding instructions, or if you are not sure the tool is properly grounded.

EXTENSION CORDS

USE ONLY 3-WIRE EXTENSION CORDS THAT HAVE 3-PRONG GROUNDING PLUGS AND 3-POLE RECEPTACLES THAT ACCEPT THE TOOLS' PLUG. REPAIR OR REPLACE A DAMAGED OR WORN POWER CORD OR PLUG IMMEDIATELY.

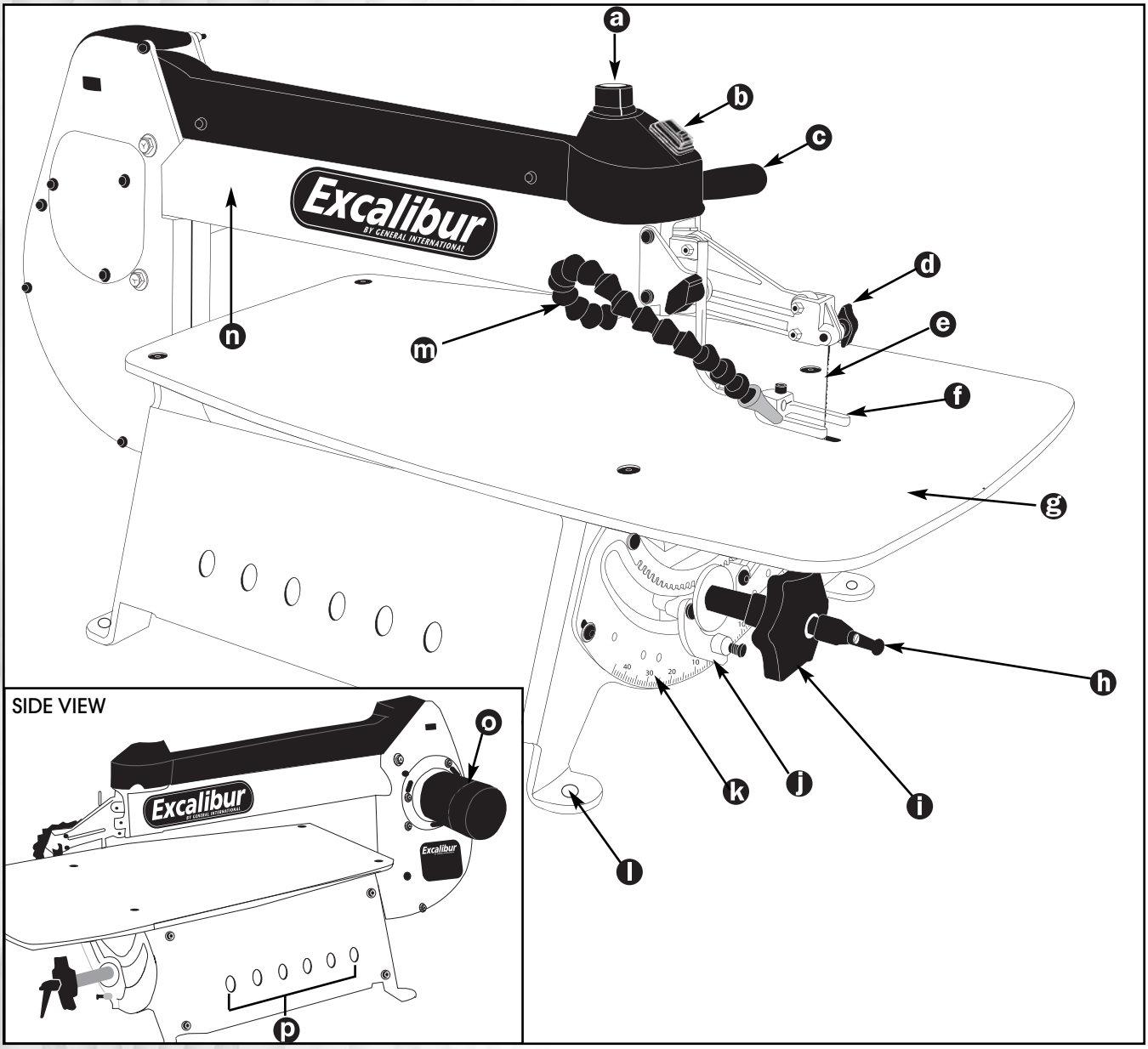
If you find it necessary to use an extension cord with your machine make sure the cord rating is suitable for the amperage listed on the motor I.D. plate. An undersized cord will cause a drop in line voltage resulting in loss of power and overheating. The accompanying chart shows the correct size extension cord to be used based on cord length and motor I.D. plate amp rating. If in doubt, use the next heavier gauge. The smaller the number the heavier the gauge.

AMPERES (AMPS)	EXTENSION CORD LENGTH					
	25 FEET	50 FEET	75 FEET	100 FEET	150 FEET	200 FEET
<5	16	16	16	14	12	12
5 TO 8	16	16	14	12	10	NR
8 TO 12	14	14	12	10	NR	NR
12 TO 15	12	12	10	10	NR	NR
15 TO 20	10	10	10	NR	NR	NR
21 TO 30	10	NR	NR	NR	NR	NR

*Based on limiting the line voltage drop to 5V at 150% of the rated amperes.
NR = Not Recommended

21” SCROLL SAW
EX-21

IDENTIFICATION OF MAIN PARTS AND COMPONENTS



- a VARIABLE BLADE SPEED CONTROL KNOB
- b ON/OFF SWITCH
- c BLADE TENSION LEVER
- d BLADE CLAMP
- e BLADE
- f WORKPIECE HOLD DOWN
- g TABLE
- h BLADE TILT LOCKING LEVER
- i TILT HANDLE
- j ANGLE INDICATOR
- k ANGLE ADJUSTMENT SCALE
- l MOUNTING HOLES (4)
- m BLOWER
- n UPPER ARM
- o MOTOR
- p BLADE HOLDER SOCKETS

UNPACKING & SET UP

UNPACKING

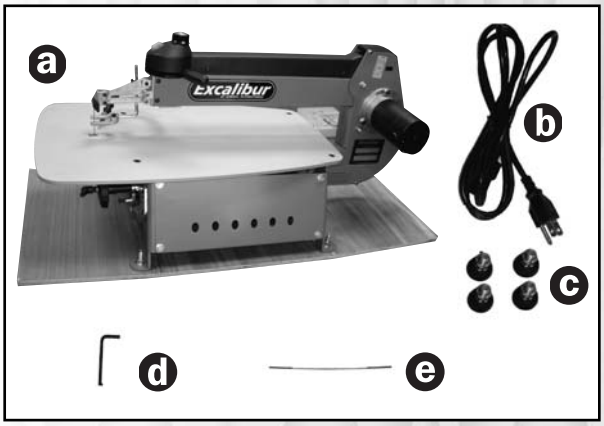
Carefully unpack and remove the scroll saw and its components from the box and check for missing or damaged items as per the list of contents below.

Note: Please report any damaged or missing items to your General International distributor immediately.

LIST OF CONTENTS

Once the parts have been removed from the packaging, you should have the following items:

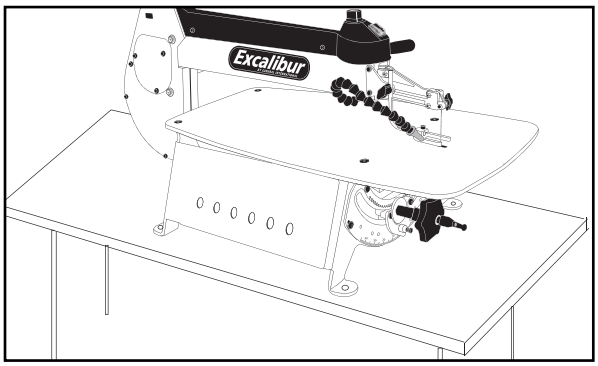
	Qty
ⓐ SCROLL SAW	1
ⓑ POWER CORD	1
ⓒ LEVELLING FEET WITH NUTS	4
ⓓ ALLEN KEY 3MM	1
ⓔ BLADE	1



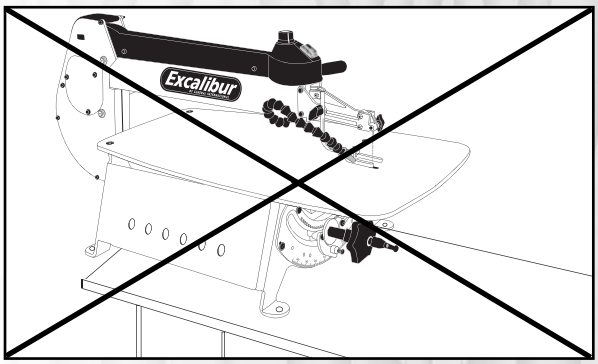
INSTALLATION & ASSEMBLY

Unscrew the 4 shipping bolts and remove the saw from the protective plywood shipping base. For your convenience this scroll saw is shipped from the factory partially assembled and requires only minimal assembly and set-up before being put into service.

Before starting the assembly, make sure that the switch is in the "OFF" position and that the power cord is unplugged. Do not plug in or turn on the scroll saw until you have completed the assembly and installation steps described in this section of the manual.

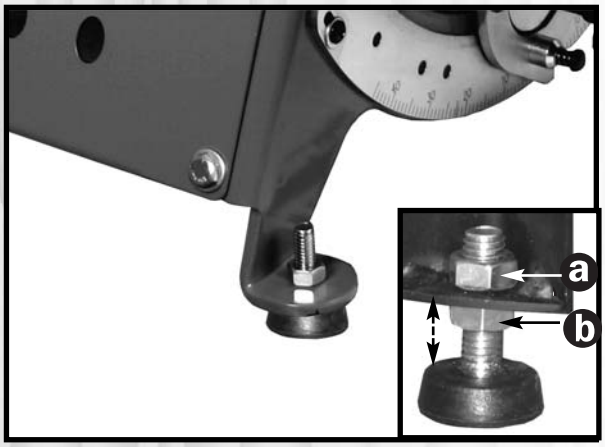


The unit should be installed on a flat, sturdy and stable surface able to support the weight of the machine and the workpiece with ease.



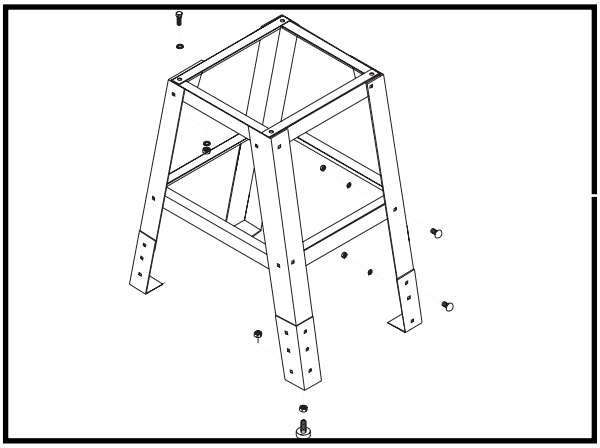
Never install the machine over the edge of a table or workbench.

Attaching the leveling feet



Install the leveling feet as shown. Loosen the upper ⓐ and lower ⓑ nuts as needed to adjust the height of the foot.

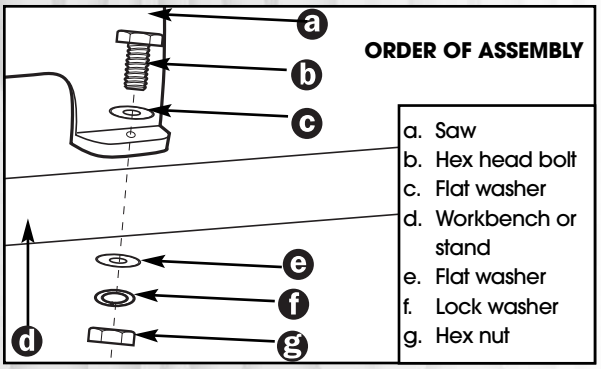
Installing the optional stand



If you prefer an optional stand (item EX-21BS is available from your local General International dealer. The stand is equipped with mounting holes allowing the saw, after removing the leveling feet, to be bolted directly to the stand.

For your safety it is essential that the machine does not rock or tip during operation. Upon start-up or during operation, if you notice any rocking, tipping or chattering of the base turn the machine off immediately and readjust the leveling feet as needed to stabilize the scroll saw on the bench or work surface.

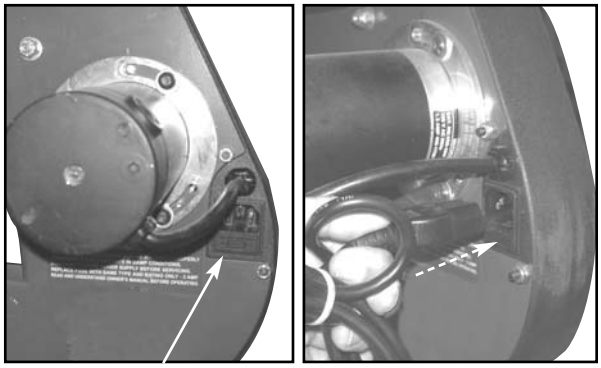
Mounting to a work surface



If a permanent shop placement is practical, consider removing the leveling feet on the base and drilling matching through holes in the mounting surface of your workbench or stand to bolt the saw in place (hardware not included) on your workbench.

If a permanent installation is not practical, clamps can also be used to secure the saw to a bench or work table.

Attaching the power cord



Plug the female end of the power cord into the socket at the rear of the saw as shown.

CHOOSING & INSTALLING A SAW BLADE

Blade Selection

Blade selection is dependent on the type and thickness of the material being cut, but is also a matter of experience and personal preference. There are numerous types of blades available on the market specifically suited for various cutting applications such as metal-cutting and spiral blades which cut in all directions. Try test-cutting with a sample of each to determine which blade works best for you with different materials. Replacement and specialty blades can be purchased from a variety of sources. Ask your local tool or scroll saw dealer for suggestions for **unpinned 5" scroll saw blades** based on what is available in your area.

Some general guidelines to consider when choosing blades:

- Wide, thick blades with coarse teeth are suited to cutting straight lines and sweeping curves, but will not turn tight corners. They will cut aggressively and leave a fairly smooth finish, but may leave burn marks if the work piece is turned too tightly.
- Narrower, thinner blades with finer teeth will cut more slowly, but will turn much tighter corners for cutting very intricate work. They will impart a very smooth, burnished finish that requires no sanding.
- Consider material thickness when selecting blades. Ensure that a minimum of two or three teeth are in contact with the workpiece at all times. For example, when cutting 1/8" thick material, use a blade with a minimum of of 16 20 teeth per inch.

SKIP TOOTH

Regular evenly spaced tooth pattern. Considered the most common of scroll saw blades, they are available in the widest range of sizes and provide a good combination of fast cutting action with good chip clearance and a relatively smooth finish.

BLADE	WIDTH	THICKNESS	TEETH/INCH	
#2/0	.022	.010	28	For extremely intricate sawing. Very tight cuts in 1/16" - 1/4" wood veneer, plastic, hard rubber, pearl, etc.
#0	.024	.011	25	
#2	.029	.012	20	For tight radius work with thin materials, 3/32" - 1/2" wood veneer, wood, bone, fiber, plastic, etc.
#4	.035	.015	15	
#5	.038	.016	12.5	For close radius work in materials 1/8" or thicker. Good for sawing hard and soft woods, bone, horn, plastic, etc.
#6	.041	.016	12.5	
#7	.045	.017	11.5	Popular sizes for cutting hard and soft woods, 3/16" up to 2". Also cuts plastic, paper, felt, bone, etc.
#9	.053	.018	11.5	
#11	.059	.019	9.5	
#12	.062	.024	9.5	

REVERSE TOOTH

Reverse teeth at the bottom of the blades prevent splintering to the underside of the workpiece.

BLADE	WIDTH	THICKNESS	TEETH/INCH	
#2/0R	.026	.011	28/20	Same applications as Skip Tooth blades.
#2R	.029	.012	20/13	
#5R	.038	.016	12.5/9	
#7R	.049	.018	11.5/8	
#9R	.054	.019	11.5/8	
#12R	.062	.062	9.5/6	

DOUBLE TOOTH

Fast, clean cutting and very efficient chip clearance.

BLADE	WIDTH	THICKNESS	TEETH/INCH	
#1D	.026	.013	30	Same applications as Skip Tooth blades.
#3D	.032	.014	23	
#5D	.038	.016	16	
#7D	.044	.018	13	
#9D	.053	.018	11	
#12D	.061	.022	10	

Installing or changing blades

Always turn off and unplug the machine before removing, handling or changing blades.

Remove an installed, worn or broken blade by loosening the thumbscrews ⓐ and ⓑ on the upper and lower blade mounts until the blade can be removed. (See Fig. 1, 2)

1. To install a blade, push the blade tension lever ⓒ (See Fig. 3) towards the rear of the saw.
2. With the blade teeth facing forward, slip one end of the blade through the hole in the table ⓓ. (See Fig. 2)
3. Fit each end of the blade into the corresponding upper ⓔ or lower ⓕ blade mounts and tighten the thumbscrews (See Fig. 1, 2) firmly by hand only – do not use tools.

   Note: Overtightening the blade clamp thumbscrews can cause pre mature wear to the blades gripping surface and result in blade slippage.
4. Pull back on the blade tension lever ⓒ to increase the tension on the blade. (See Fig. 3)

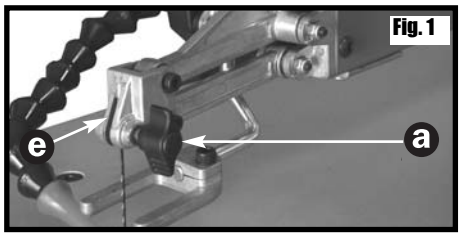


Fig. 1

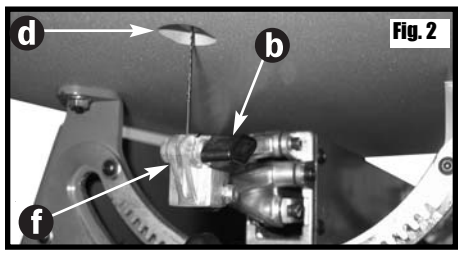


Fig. 2

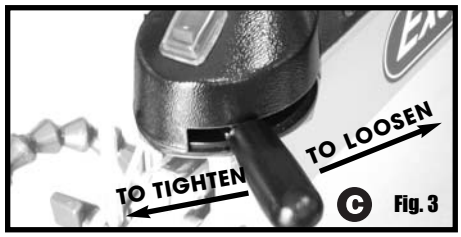


Fig. 3

Helpful Hints on blade tension: *Determining correct blade tension is somewhat subjective. It is learned through experience and is somewhat dependant on personal preference. A properly tensioned blade will last longer and be much less likely to break prematurely. If the blade tension is too loose, you will notice that the blade will have a tendency to drift or slip off-line when cutting and you may also experience excessive vibration or unusual noise. A blade that is too tight will break prematurely.*

Assuming the blade has been properly installed in the blade mounts, when the blade tension lever is pulled fully forward towards the front of the saw, the blade should be properly tensioned. If not, the blade is most likely not properly positioned in the mounts.

5. Test the blade tension by lightly plucking on the blade, like you would a guitar string, with your finger. If the blade is tight and tensioned correctly you will get a clear and even note. If so, you are ready to proceed to operating and cutting with the saw.
6. If not tensioned correctly, release the blade tension lever, reset the blade properly in the blade mounts, re-tension the lever and "pluck-test" again. Proceed to operating and cutting with the saw only when you are satisfied that the blade is tensioned properly.

Blade storage

There are 6 sockets (mounting holes) on either side of the base of the saw to hold blade storage "test tubes" (tubes not supplied). Most blade retailers sell blades either already in the tubes or will be able to sell spare tubes separately. Storing your spare blades in tubes, by size, right on the base of the machine can be a great way to organize your spare blades so that they are handy and available when needed. (See Fig. 4)

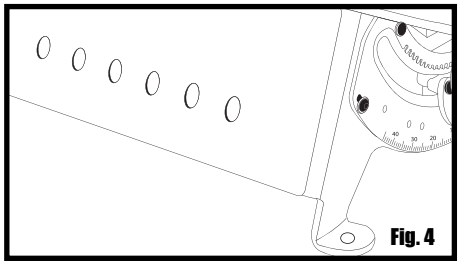


Fig. 4

OPERATING INSTRUCTIONS

On/Off switch

A simple, dust protected rocker style on/off switch ⓐ is located on the top front of the saw. (See Fig. 5)

Adjusting the blade speed

The Ex-21 Scroll Saw is equipped with a variable blade speed control which allows you to select or fine-tune to the exact blade speed required (from 400-1550 strokes per minute) for best results based on the type and thickness of material and type of blade being used.

The blade speed control knob ⓑ is located on the top front of the machine. (See Fig. 5)

- To increase blade speed, turn the control knob clockwise.
- To decrease blade speed turn the control knob counter clockwise.

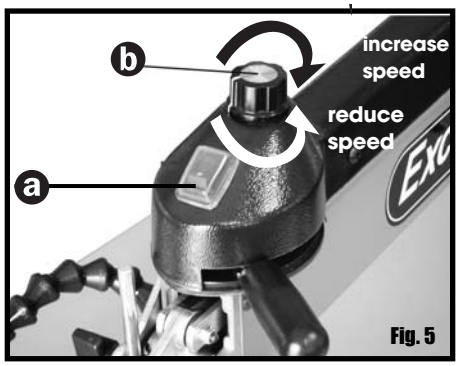


Fig. 5

Blade speed selection is subjective and is dependant on a variety of factors: type and thickness of material being cut, type of blade being used, feed rate, required finish quality as well as experience, personal preference and comfort level of the user. There are no hard and fast rules. Be patient – practice and experience will be your best teacher.

Here are some general guidelines to consider when selecting/adjusting blade speed:

- For best results and smoothest most efficient cutting, always select the highest blade speed that you are comfort able using based on your experience and skill level.
- Generally speaking, harder or denser workpiece material requires slower blade speeds.
- Slower speeds also work better with very thin blades, or when cutting most metals as well as for brittle or delicate material such as fine veneers.
- Some wood species will have a tendency to burn quicker at higher blade speeds. To avoid additional sanding later, reduce blade speed and feed speed at the first signs of burn marks on the workpiece.

Adjusting the Blower

The EX-21 is equipped with a built-in blower to help clear cutting dust from the workpiece surface in front of the blade and on any reference lines. Adjust the blower tube ⓐ as needed to point the nozzle at the blade to set it at a comfortable distance so as not to obstruct your hand movement as you work. (See Fig. 6)

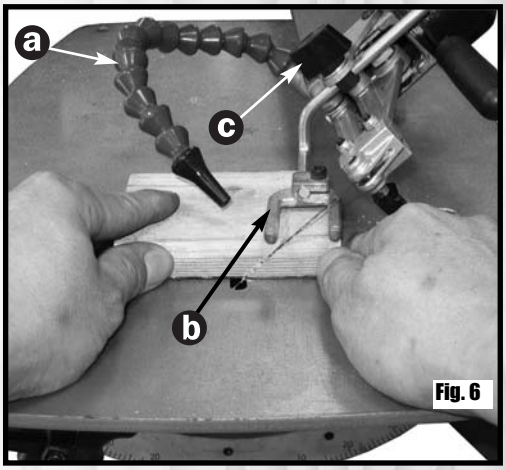


Fig. 6

Workpiece Hold-Down

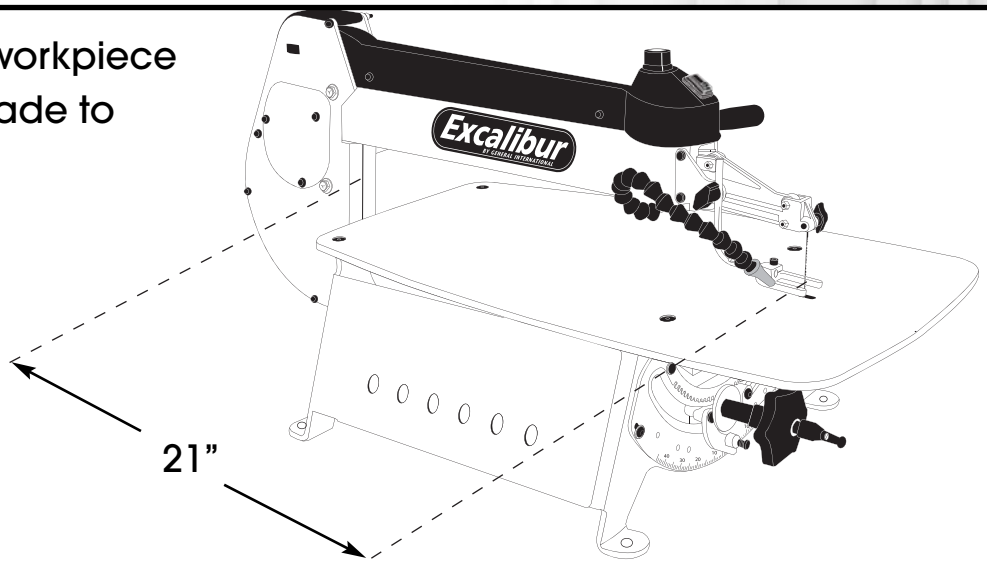
The workpiece hold-down ⓑ (See Fig. 6) can be adjusted to assist in preventing the blade from lifting the workpiece up from the table during the cut. Loosen the thumbscrew ⓒ to set the height to your convenience based on the thickness of the workpiece. Before cutting, test to make sure that the hold-down is not adjusted too tightly to the workpiece or that it obstructs the movement of the workpiece.

Basic 90° straight or curved cuts

All cuts made with the blade at 90° to the table follow the same basic principals. Start by marking or transferring your pattern or reference lines onto you workpiece.

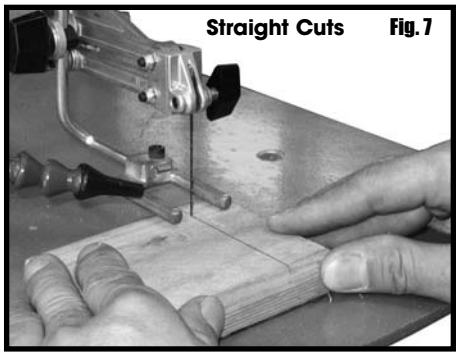
Note: The EX-21 has a 21" throat that allow for a workpiece of up to 21" of clearance to swing completely around without hitting the back of the saw. If necessary, rough-cut the workpiece down to a workable size before starting intricate work on the scroll saw.

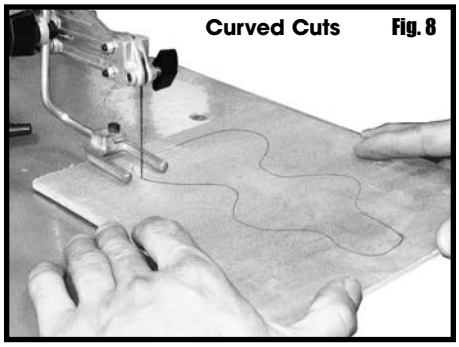
Maximum workpiece size from blade to rear of saw



1. With the saw turned off and unplugged, install the appropriate blade for the type of material to be cut and the type of cut to be made (Refer to the section "Choosing and Installing a Saw Blade" on page 9).
2. Adjust the workpiece hold-down and the blower nozzle to your liking.
3. Turn on the saw and set the speed controller to the desired blade speed.
4. With your fingers holding the piece firm to the table, and using your thumbs for directional control, (See Fig #7 & 8) feed the workpiece into the blade using steady, even pressure.
5. Make sure that the blade is cutting on the waste side of your reference line and adjust feed direction slighty as needed to compensate for blade drift.

Cutting Tips: To stay in control on tight curve cuts, slow down your feed rate as needed to allow the blade teeth time to make the cut. Avoid coming to a complete stop whenever possible as this can leave burn marks on the workpiece and also makes it more difficult to get the piece re-started and moving through the cut again. Avoid forcing through a curve cut as this can cause the blade to twist and cut off-track or may even cause the blade to break.


Straight Cuts Fig. 7


Curved Cuts Fig. 8

Fret Cutting

Fret or inside cutting is an operation that can only be performed on a scroll saw. Fret cutting involves drilling a small guide or pilot hole through the interior of your pattern on the workpiece, then disconnecting one end of the blade which is fit through the guide hole and re-connected; essentially using this guide hole as the starting point to cut out the piece from within. A typical example of fret cutting would be removing the center portion of lettering. (See Fig. 9)

The EX-21 is a great tool for fret cutting because unlike most scroll saws it allows you to raise the upper arm with the blade attached, line up the guide hole in your workpiece with the hole in the table and then lower the arm while guiding the blade through the hole from above (see step by step instructions below). This can be a very useful time saving feature, particularly for intricate or complex fret designs that can involve dozens or even hundreds of holes.

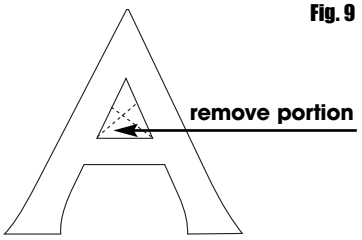


Fig. 9

1. With the saw turned off and unplugged, install the appropriate blade for the type of material to be cut and the type of cut to be made (Refer to the section "Choosing and Installing a Saw Blade" on page 9 of this manual).
2. With your pattern or design transferred onto the workpiece, drill a guide hole in the inside waste portion of the workpiece. (See Fig. 10) Make sure that the hole is large enough for the blade to fit through.

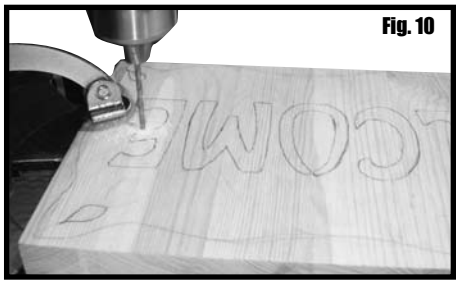


Fig. 10

Helpful hints on drilling guide holes: If multiple fret cuts are required on the same workpiece, drill all of your required guide holes before taking the workpiece to the scroll saw. This will keep you from going back and forth from the saw to the drill press.

To prolong blade life by limiting unnecessary cutting, drill your guide holes as close as possible to your reference lines. (See Fig. 11)

Fig. 11

3. Release tension on the blade by pushing the blade tension lever towards the rear of the saw.

4. Loosen the thumbscrew on the lower blade mount, located under the table, to release the blade from the mount.

5. Raise the upper arm assembly which will lift the blade up through the hole and above the table.

6. Position the workpiece on the table so that the guide hole lines up with the hole in the table.

7. Lower the arm assembly with one hand while guiding the blade through the hole in the workpiece and table.

8. Re-install the bottom end of the blade in the lower blade mount and tighten the thumbscrew to secure the blade in the lower blade mount.

9. Pull back on the blade tension lever to re-tension the blade and test the blade tension as described in "Installing or Changing Blades" section of this manual.

10. To begin cutting follow the same steps as described in "Basic 90° straight or curved cuts" section on page 9 of this manual.

To reduce the risk of injury, always turn off the saw and wait for the blade to come to a complete stop before reaching in to remove waste material from a fret cut.

Angle or Bevel Cutting

One of the unique features of the EX-21 Scroll Saw is the ability to tilt the head of the saw in order to make angle or bevel cuts. The table and the workpiece always stay horizontal (parallel to the floor) while the blade tilts, keeping your hands in the same comfortable cutting position as they would normally be for regular right angle cuts. Because you are not fighting gravity or working with your hands or wrists bent in awkward positions, it can be a huge advantage and makes it easier and safer to make accurate bevel cuts.

The blade tilt controls are located under the table at the front saw. (See Fig. 12)

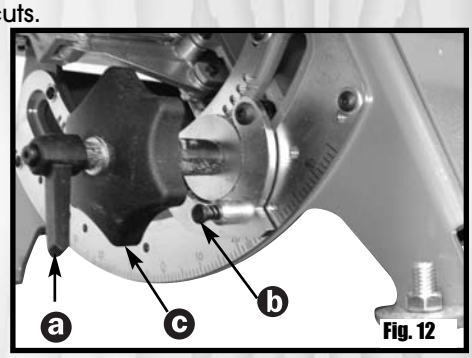


Fig. 12

To tilt the blade for bevel cutting:

1. Release the locking lever ⓐ by turning counter-clockwise
2. Pull back and hold the spring loaded indexing pin ⓑ from the 90° stop hole and turn the tilting handle ⓒ left or right to set the blade to the desired angle.

Note: The spring loaded indexing pin ⓑ will allow you to automatically lock in at 90° as well as common angles, 45, 30 & 22.5 both left and right.

When tilting the blade to the left at extreme angles, it may be necessary to remove and reverse the lower blade mount thumbscrew assembly in order to maximize clearance under the table. (Fig. 13 shows the lower blade mount in default position and Fig. 14 shows it reversed)

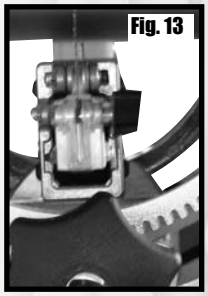


Fig. 13

Fig. 14

3. Tighten the locking lever ⓐ to secure the blade at the desired angle.
4. To begin cutting follow the same steps as described in "Basic 90° straight or curved cuts" section on page 11 of this manual. Fig. 15 shows the scroll saw in position for bevel cutting.

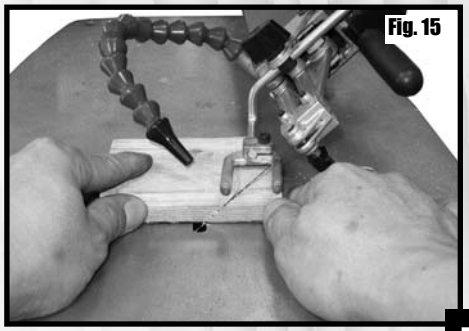
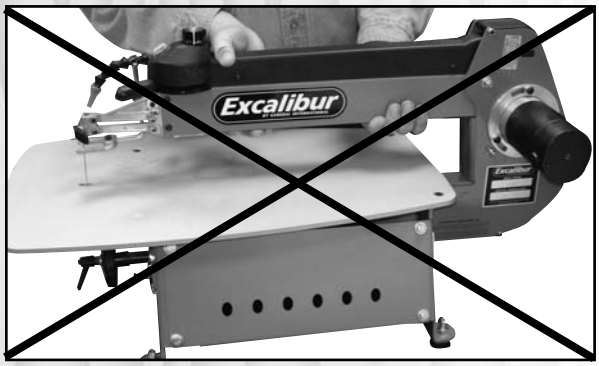


Fig. 15

To reduce the risk of injury, always turn off the saw and wait for the blade to come to a complete stop before reaching in to remove waste material.

MAINTENANCE, ADJUSTMENTS AND SERVICING

Handling

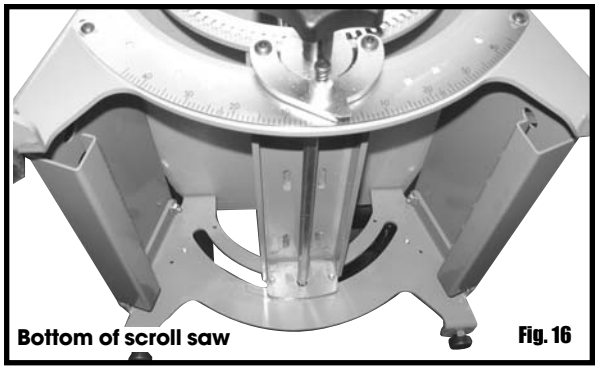


Never lift the saw by the upper arm assembly as this will result in damage to the drivetrain.

Rather lift the saw by the front of the table and by the motor.

Maintenance

- Always release tension on the blade when the saw is not in use.
- Clean the saw regularly with a soft bristle brush or by vacuuming to keep cutting dust from accumulating.
- An occasional application of a light dab of grease on the front and rear trunnions (See Fig. 16) will keep the tilting mechanism working smoothly. If you find the tilting mechanism becoming more difficult to operate, thoroughly wipe off any built-up cutting dust on the trunnions and re-apply a little grease.
- The bearings in the drive mechanism are sealed and permanently lubricated and do not need to be oiled or greased.



Bottom of scroll saw — Fig. 16

Squaring the blade to the table

Depending on frequency of use and how much the tilting mechanism is used, normal wear will over time cause the blade to come slightly out of alignment with the table. Periodically check the blade for square with the table. When needed, adjust as described in the following steps to re-align the blade square to the table.

1. Turn off and unplug the saw.
2. Using the blade tilt controls at the front of the saw, set the blade angle to read 0 - which is 90° vertical to the table.
3. Set a machinists square on the table and against the blade to verify the blade angle. (See Fig. 17)
4. If the blade angle requires adjustment loosen the 4 bolts in the front trunnion ⓐ as well as the 4 bolts on the rear trunnions ⓑ.
5. By hand, move the entire head to bring the blade square to the table.
6. With the blade square to the table hold the head in position and re-tighten the bolts on the front and rear trunnions.

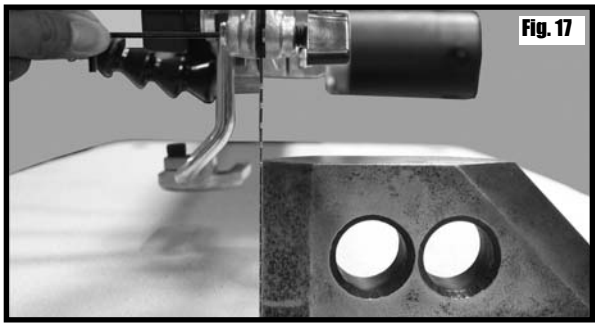
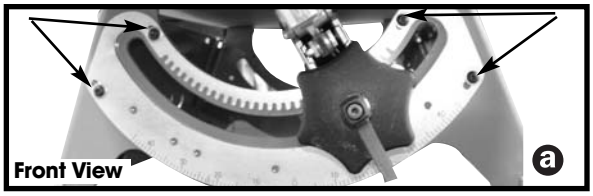


Fig. 17

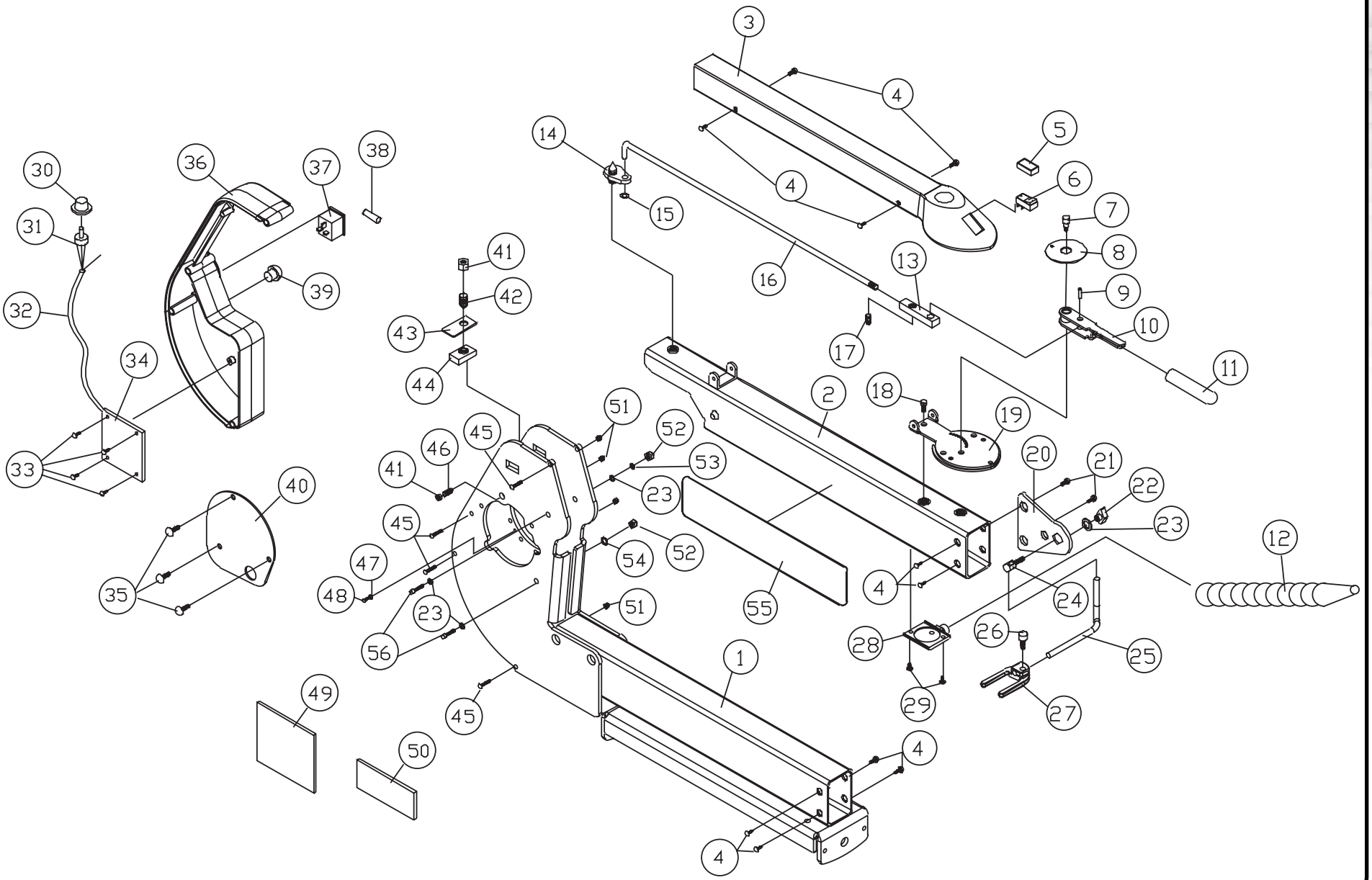


Front View ⓐ

Back View ⓑ

NOTES

#EX-21 A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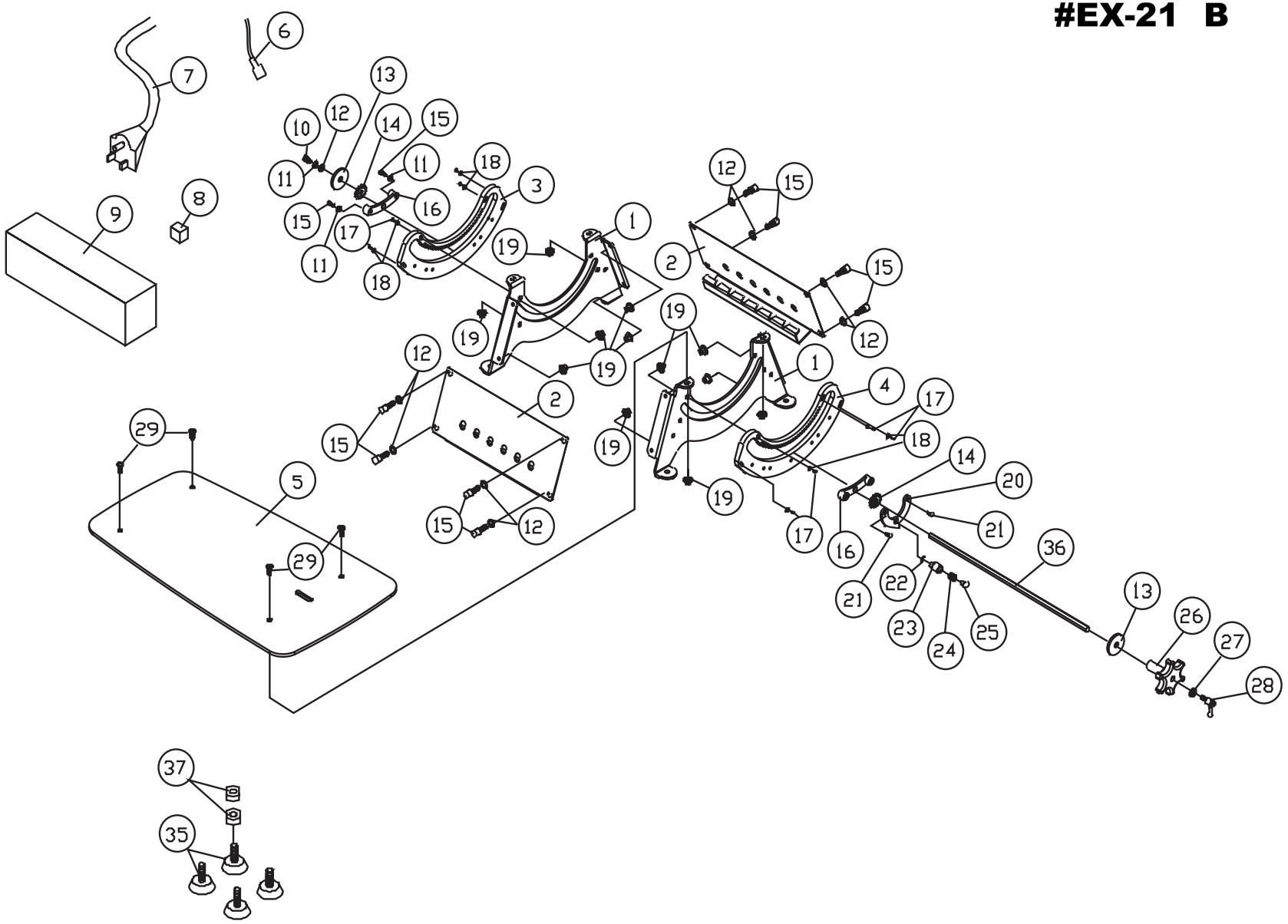
PARTS LIST - EX-21 (A)

PART N0.	DESCRIPTION	SPECIFICATION	QTY
EX21-A01	MAIN BODY		1
EX21-A02	UPPER ARM		1
EX21-A03	TOP COVER		1
EX21-A04	ALLEN SCREW	#10-32X1/4	10
EX21-A05	SWITCH COVER		1
EX21-A06	SWITCH		1
EX21-A07	SCREW	5/16-5/8	1
EX21-A08	PLASTIC WASHER		1
EX21-A09	SPRING PIN	1/4X5/8	1
EX21-A10	TENSION LEVER ASS'Y		1
EX21-A11	TENSION LEVER HANDLE		1
EX21-A12	AIR NOZZLE		1
EX21-A13	TENSION ROD END BLOCK		1
EX21-A14	TENSION JACK SCREW LEVER		1
EX21-A15	NUT	SPN1/4	1
EX21-A16	TENSION ROD		1
EX21-A17	SCREW	1/4X1/2	1
EX21-A18	BOLT		1
EX21-A19	UPPER & LOWER TENSION PLATE		1
EX21-A20	HOLD DOWN MOUNT PLATE		1
EX21-A21	ALLEN SCREW		2
EX21-A22	HOLD DOWN CLAMP KNOB		1
EX21-A23	WASHER	1/4X16X1.8	4
EX21-A24	HOLD DOWN CLAMP NUT		1
EX21-A25	HOLD DOWN BAR		1
EX21-A26	CAP SCREW	#10-32X1/2	1
EX21-A27	HOLD DOWN FORKS		1
EX21-A28	DUST BLOWER		1
EX21-A29	SCREWS	#8-32UNF3/8"	2
EX21-A30	VR KNOB		1
EX21-A31	VR		1
EX21-A32	CONTROL CABLE		1
EX21-A33	SCREW	M4X8	4
EX21-A34	MOTOR CONTROL SET		1
EX21-A35	SCREW	1/4-20X1/2	3
EX21-A36	CONTROL BOX		1
EX21-A37	LINE CORD SOCKET		1
EX21-A38	FUSE		1
EX21-A39	STRAIN RELIEF		1
EX21-A40	GEAR COVER		1
EX21-A41	NUT	3/8"-16	2
EX21-A42	SET SCREW	3/8 X 1 X 1/4	1
EX21-A43	CROSS BLOCK RETAINER		1
EX21-A44	HOUSING CROSS BLOCK		1
EX21-A45	SCREW	#10-32X2-1/4	4
EX21-A46	SCREW	3/8X5/8	1
EX21-A47	WASHER	#8	1
EX21-A48	SCREW	#8-32X3/8	1
EX21-A49	MOTOR LABEL		1
EX21-A50	WARNING LABEL		1
EX21-A51	NUT	#10-32	4
EX21-A52	NUT	1/4-20UNC	2
EX21-A53	LOCK WASHER	1/4	1
EX21-A54	WASHER	1/4.(Ø13)	1
EX21-A55	LABEL		2
EX21-A56	SCREW	1/4 X 2-1/2	2

#EX-21 B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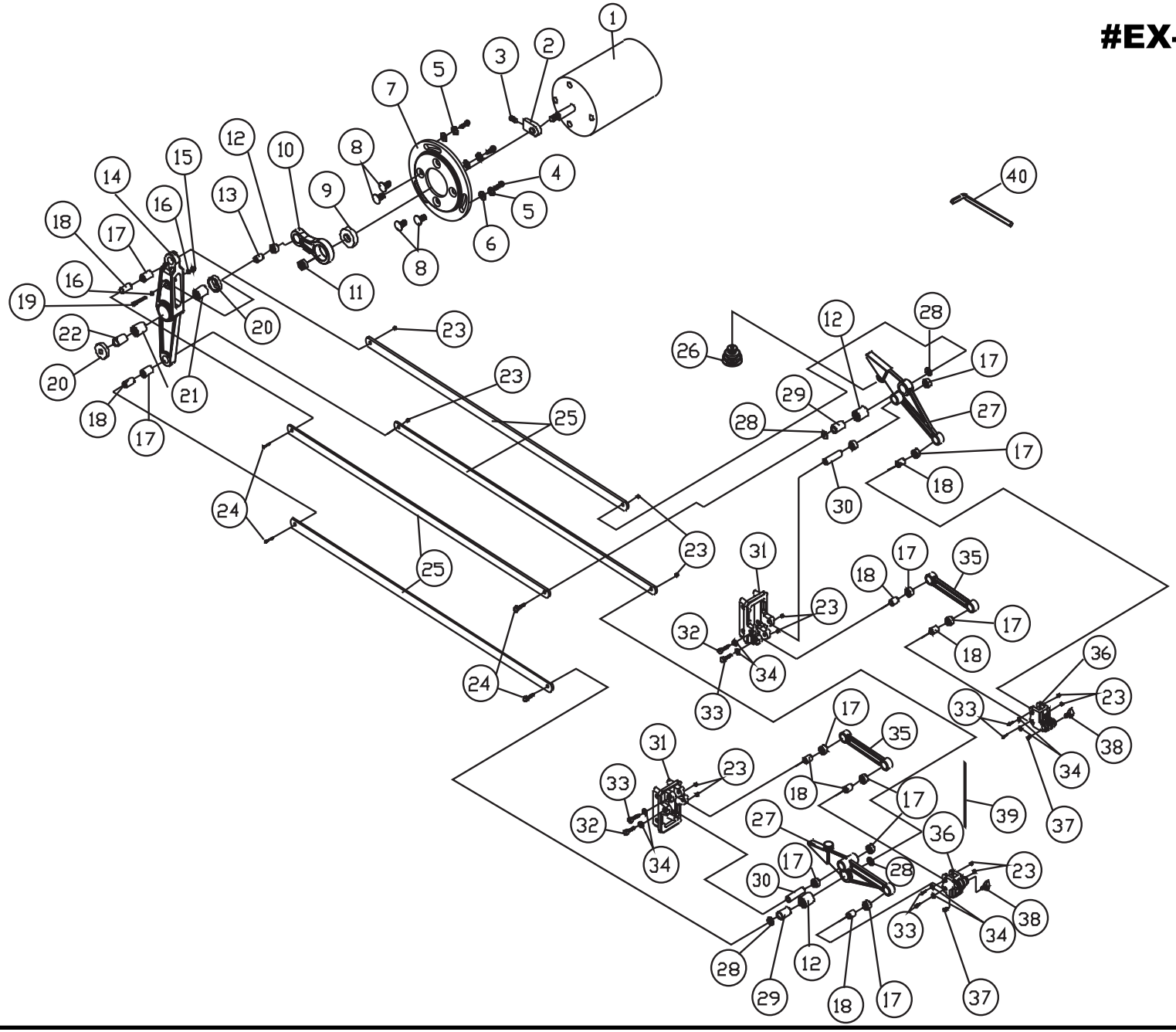
PARTS LIST - EX-21 (B)

PART N0.	DESCRIPTION	SPECIFICATION	QTY
EX21-B01	TRUNNION		2
EX21-B02	SIDE PANEL		2
EX21-B03	REAR TRUNNION PLATE		1
EX21-B04	FRONT TRUNNION PLATE		1
EX21-B05	TABLE		1
EX21-B06	GROUND JUMPER		1
EX21-B07	POWER CORD		1
EX21-B08	SPONGE BLOCK		1
EX21-B09	POLYFOAM		1
EX21-B10	SCREW	1/4-20UNC X1/2	1
EX21-B11	LOCK WASHER	1/4	3
EX21-B12	WASHER	1/4X16X1.8	9
EX21-B13	BLADE TILT WASHER		2
EX21-B14	BLADE TILT DRIVE GEAR		2
EX21-B15	SCREW	1/4-20UNC X 3/4	10
EX21-B16	ANGLE FOLLOWER		2
EX21-B17	SCREW	#10-32X5/16	8
EX21-B18	WASHER	#10X32X1	8
EX21-B19	NUT	1/4-20UNC	12
EX21-B20	ANGLE INDICATOR		1
EX21-B21	SCREW	1/4-20X1	2
EX21-B22	E-RING	ETW-3	1
EX21-B23	TILT DETENT BARREL		1
EX21-B24	SPRING		1
EX21-B25	DETENT PLUNGER		1
EX21-B26	TILT HANDLE		1
EX21-B27	WASHER	1/4X16X3	1
EX21-B28	BLADE TILT LOCKING LEVER		1
EX21-B29	FLAT HEAD SCREW	1/4-20X3/4	4
EX21-B35	LEVELLING FOOT	3/8" X 1-1/4	4
EX21-B36	TILT LOCK DRAW ROD		1
EX21-B37	NUT	3/8"	8

#EX-21 C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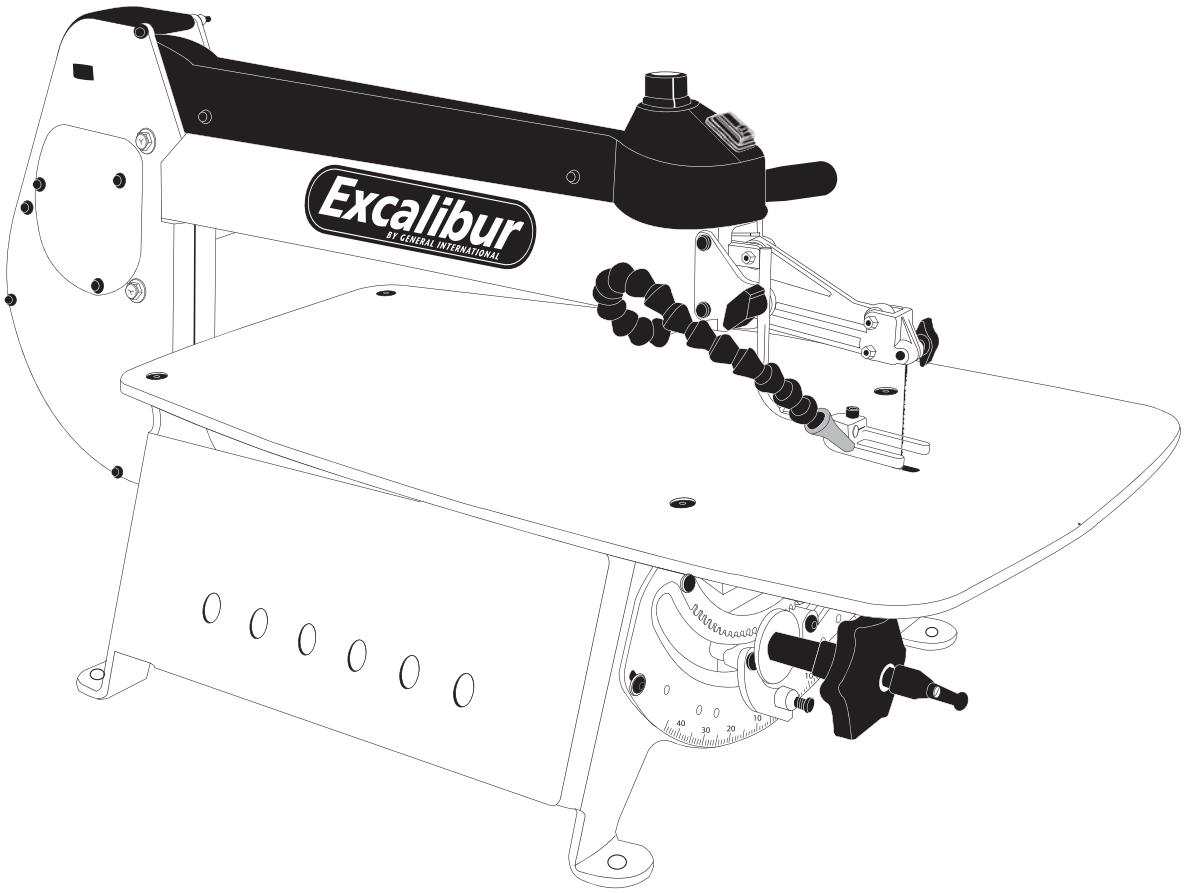
PARTS LIST - EX-21 (C)

PART N0.	DESCRIPTION	SPECIFICATION	QTY
EX21-C01	MOTOR		1
EX21-C02	BALANCE BLOCK		1
EX21-C03	SET SCREW	M6 X 6	1
EX21-C04	ALLEN SCREW	1/4-20X1/2	3
EX21-C05	LOCK WASHER	1/4	3
EX21-C06	FLAT WASHER	1/4X16X1.8	3
EX21-C07	MOTOR COVER PLATE		1
EX21-C08	SCREW	M6X16	4
EX21-C09	BEARING	608ZZ	1
EX21-C10	MOTOR CAM		1
EX21-C11	NUT	M8 X P1.25 LH	1
EX21-C12	BEARING	0810	3
EX21-C13	CONNECTING ROD		1
EX21-C14	ROCKER ARM		1
EX21-C15	NUT	M5	1
EX21-C16	WASHER	M5	2
EX21-C17	BEARING	0609	12
EX21-C18	BEARING INNER SLEEVE (SHORT)		8
EX21-C19	CAP SCREW	M5 X 28	1
EX21-C20	BEARING COVER		2
EX21-C21	BEARING	1412	2
EX21-C22	MAIN ROCKER PIVOT		1
EX21-C23	NUT	M4	12
EX21-C24	CAP SCREW	M4 X 25	4
EX21-C25	DRIVE LINK		4
EX21-C26	AIR PUMP BELLOWS		1
EX21-C27	FRONT ROCKER		2
EX21-C28	WASHER	M8 X 15 X 0.6	4
EX21-C29	BEARING INNER SLEEVE-FRONT ROCKER		2
EX21-C30	BEARING INNER SLEEVE (LONG)		2
EX21-C31	ROCKER MOUNT		2
EX21-C32	CAP SCREW	M4 X 40	2
EX21-C33	CAP SCREW	M4 X 20	6
EX21-C34	WASHER	M4 X 8 X 1	8
EX21-C35	STRUT		2
EX21-C36	BLADE CHUCK		2
EX21-C37	SET SCREW	M6 X 8	2
EX21-C38	BLADE CLAMP THUMBSCREW		2
EX21-C39	BLADE		1
EX21-C40	ALLEN KEY	3MM	1

EX-21



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